

# Prevalence of Osteopenia and Osteoporosis in Postmenopausal Women

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**Objective.** To know the osteopenia and osteoporosis prevalence in postmenopausal women determined with broadband ultrasonic attenuation (BUA).

**Design.** Descriptive cross-sectional study of prevalence.

**Setting.** Salvador Allende Health Center. Valencia. Spain.

**Participants.** A total of 115 postmenopausal women aged 49 to 85 years old was studied, initiated in September to December 2003. Iatrogenic menopause or women with calcium, vitamin D, estrogen replacement therapy, estrogen receptor modulators, and bisphosphonates therapy were considered criteria for exclusion. We measured bone mineral density with BUA at right calcaneus.

**Main measurements.** We analyzed the age, height, and weight, the result of BUA, tobacco and diuretics consumption and years of amenorrhea.

**Results.** The prevalence of osteoporosis was 50.4%. Other 29.6% had osteopenia. Of the postmenopausal women with osteoporosis, 27.6% were 70 to 75 years old. The 82.8% of postmenopausal women with osteoporosis were younger than 75 years old. The 66.7% postmenopausal women with body mass index lesser than 25 had osteoporosis.

**Conclusions.** The osteoporosis prevalence in our patients was greater than other studies (30%). Emphasis may be placed on screening osteoporosis with BUA in primary health care. We suggested that educational community programs should start at an earlier age to identify factors that contribute to maintaining bone mineral density among postmenopausal women.

**Key words:** Prevalence. Bone density. Osteoporosis postmenopausal.

## PREVALENCIA DE OSTEOPENIA Y OSTEOPOROSIS EN MUJERES POSMENOPÁUSICAS

**Objetivo.** Estudiar la prevalencia de osteopenia y osteoporosis en mujeres posmenopáusicas mediante ultrasonografía ósea cuantitativa (UOC).

**Diseño.** Estudio descriptivo, transversal, de prevalencia.

**Emplazamiento.** Centro de Salud Salvador Allende. Valencia.

**Participantes.** Se incluyó a 115 mujeres posmenopáusicas de 49-85 años durante los meses de septiembre a noviembre de 2003. Se excluyó a las mujeres con menopausia iatrogénica o que previamente hubieran tomado calcio, vitamina D, terapia hormonal sustitutiva, moduladores estrogénicos o bifosfonatos. A las participantes se les realizó una UOC en el calcáneo derecho.

**Mediciones.** Analizamos la edad, la talla y el peso, el resultado de la UOC, el consumo de tabaco y de diuréticos, y los años de amenorrea.

**Resultados.** La prevalencia de la osteoporosis fue del 50,4%. Otro 29,6% presentaba osteopenia. De las mujeres posmenopáusicas que presentaban osteoporosis, el 27,6% tenía 70-75 años y el 17,2%, 55-60 años. El 82,8% de las mujeres posmenopáusicas con osteoporosis era < 75 años. El 66,7% de las pacientes con un índice de masa corporal < 25 tenía osteoporosis.

**Conclusiones.** La prevalencia de osteoporosis en nuestras pacientes fue mayor que en otros estudios (30%). Insistimos en la necesidad de realizar el cribado de la osteoporosis con UOC en atención primaria. Sugerimos que los programas de educación comunitaria deberían comenzar en edades más tempranas para identificar los factores que contribuyen a mantener la densidad mineral ósea en las mujeres posmenopáusicas.

**Palabras clave:** Prevalencia. Densidad ósea. Osteoporosis posmenopáusica.

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Manuscript received September 1, 2004.  
 Manuscript accepted for publication November 10, 2004.

## Introduction

Osteoporosis is defined as a skeletal disease characterized by diminished bone strength that predisposes a person to an increased risk of fractures. In epidemiological terms it affects 35% of all women older than 50 years, with the percentage rising to 52% in women more than 70 years old.<sup>1</sup>

Because of the steady aging of our society, osteoporosis can be considered an emerging health problem.<sup>2</sup> It is important to determine the factors involved in this, as the most effective way to prevent osteoporotic fractures is by early management.<sup>3</sup>

Measuring bone mineral density (BMD) is the best way to confirm or rule out a diagnosis of osteoporosis.<sup>4</sup> Dual absorption x-ray absorptiometry (DEXA) is the most widely used diagnostic technique.

Predictions of the risk of fractures are most accurate when BMD is measured directly in the bone tissues involved most often (spinal column and hip).

However, measurements in peripheral bone are technically simpler. Among the methods for measuring bone mass in peripheral bone, ultrasound has shown an association with the prevalence (cross-sectional studies) and risk of fractures (prospective studies). This method provides an indication of the risk of fracture (especially hip fractures) that is independent from BMD, and is currently recommended as a rapid alternative for bone mass measurements that does not involve irradiation.<sup>5</sup>

Quantitative bone ultrasound examination or broadband ultrasonic attenuation (BUA) has been shown to have the same predictive value for vertebral column fractures as DEXA for the spinal column and hip (OR, 2.2; 95% CI, 1.7-2.9 per standard deviation in the spinal column; OR, 1.7; 95% CI, 1.3-2.1 per standard deviation in the hip).<sup>6,7</sup>

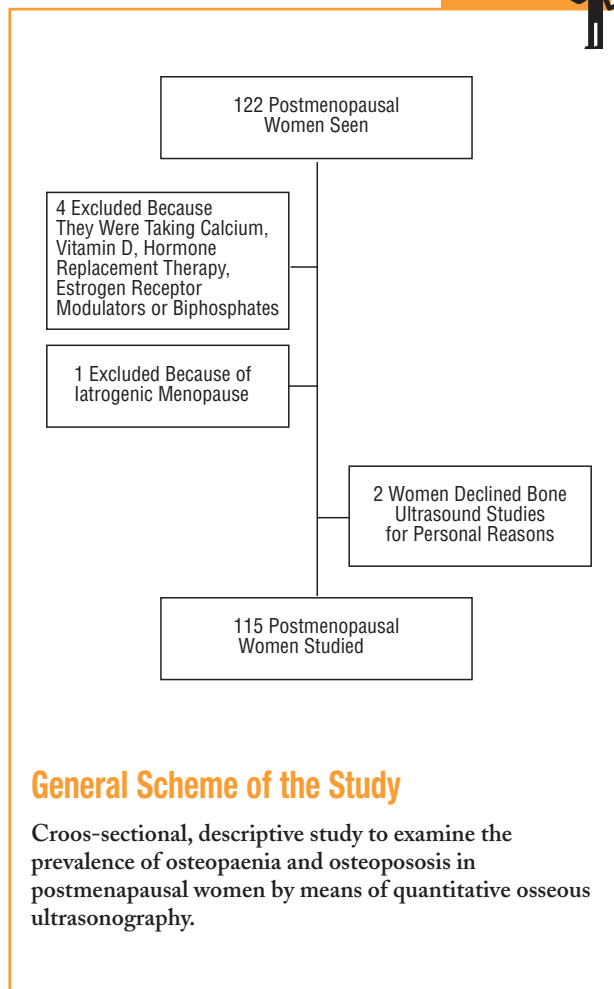
The prevalence of osteoporosis is probably higher than reported figures indicate, and the present study was done to determine the prevalence of alterations in BMD in postmenopausal women with bone ultrasound studies.

## Patients and Methods

This descriptive, cross-sectional prevalence study was carried out at the Salvador Allende Primary Care Health Center in Valencia (eastern Spain). We selected all postmenopausal women served by our center who were seen during September, October, and November 2003. As exclusion criteria we used iatrogenic menopause and use of calcium, vitamin D, hormone replacement therapy, estrogen receptor modulators or bisphosphonates.

Bone ultrasound studies were done in the right calcaneus with a Norland McCue CUBA Clinical ultrasound sonometer (Norland Medical Systems) and the results were recorded as BUA. The findings for this study were reported as osteoporosis, osteo-

## Material and methods



### General Scheme of the Study

Cross-sectional, descriptive study to examine the prevalence of osteopaenia and osteoposis in postmenapausal women by means of quantitative osseous ultrasonography.

penia, or normal bone density on the basis of the t-score according to WHO criteria. Osteoporosis was recorded when bone mass figures were more than 2.5 standard deviations (SD) below peak bone mass, i.e., the maximum value for bone mass in young women. Osteopenia was recorded when bone mass was between 1 and 2.5 SD below peak bone mass.

The sample size needed, as calculated with the Epi-info program for a precision of 95%, was 86 patients ( $P < .05$ ; alpha level, .05) assuming a prevalence of BMD alterations of 49%.

The variables studied here were age in years, weight in kilograms, height in meters, ultrasound bone densitometry findings, smoking habit (more than 10 cigarettes/day during the previous year), use of diuretics, and years of amenorrhea.

Laboratory values and pathological findings were recorded from the patient's medical record held at the health center.

Mean age of the population served by our center was 39.6 years. The population in our catchment area was considered mostly mature (Friz index, 71) and regressive, i.e., the percent population older than 50 years was greater than the percent population between 15 and 50 years of age.

All data were processed and analyzed with the SPSS (version 11.0 for Windows). Descriptive statistics for each variable were reported as the mean and SD for quantitative variables, and as percentages for qualitative variables.

## Results

The characteristics of our patients are summarized in Table 1. Of the 115 postmenopausal women studied here, 58 had osteoporosis and 34 had osteopenia. The prevalence of osteoporosis was 50.4% (95% CI, 45.7%–55%), and the prevalence of osteopenia was 29.6% (95% CI, 25.3%–33.8%). Thus 80% (95% CI, 76.3%–83.7%) of the women in this study had some BMD alteration.

Of the 58 women with osteoporosis, the 55–60 year old age group accounted for 17.2% of this group and the 70–75 year old age group accounted for 27.6%. Of the 34 postmenopausal women with osteopenia, 32.4% were 55–60 years old. Most of the postmenopausal women with osteoporosis (82.8%) were less than 75 years old.

Two thirds (66.7%) of the postmenopausal women with a body mass index less than 25 had osteoporosis. Table 2 shows the percentage figures for the frequency of alterations in BMD according to body mass index.

According to the criteria of the Agència d’Avaluació de Tecnologia Mèdica<sup>11</sup> and the Sociedad Española de Medicina de Familia y Comunitaria<sup>4</sup> for the indication for

**TABLE 1** Characteristics of the Patients

	Minimum	Máximo	Mean (Standard Deviation)
Body mass index	18.1	50.3	29.8 (5.7)
Age, years	49	85	65.3 (8.8)
Years amenorrhea	0	43	15.4 (9.4)
Bone mineral density	Normal	Osteopenia	Osteoporosis
	23 (20%)	34 (29.6%)	58 (50.4%)
Use of diuretics	No	Yes	
	96 (83.5%)	19 (16.5%)	
Smoking habit	No	Yes	
	109 (94.2%)	6 (5.2%)	

**TABLE 2** Percentage of Postmenopausal Women With Altered Bone Mineral Density According to Body Mass Index (BMI)

BMI	Bone Mineral Density		
	Normal	Osteopenia	Osteoporosis
<25	1 (4.8%)	6 (28.6%)	14 (66.7%)
25–30	9 (20%)	12 (26.7%)	24 (53.3%)
30–35	9 (30%)	9 (30%)	12 (40%)
35–40	3 (23.1%)	5 (38.5%)	5 (38.5%)
>40	1 (16.7%)	2 (33.3%)	3 (50%)
Total	23 (20%)	34 (29.6%)	58 (50.4%)

**TABLE 3** Basic Risk Factors Associated With Osteoporosis

Nonmodifiable	Modifiable
Menopause	Inadequate calcium intake
Early, <45 years	(Requirements: 1000–1200 mg/day)
Surgical	
Menopause >10 years	Body mass index <19
Age	Inadequate vitamin D intake
	(requirements: 400–800 IU/day)
Genetic factors	
Familial antecedents of osteoporotic fracture	Smoking habit: >1 pack/day
Familial history of osteoporosis	Excess alcohol intake
Physical exercise	
Sedentary lifestyle and immobilization predispose to osteoporosis	
Imbalanced diet	
Excess dietary protein, vegetarian diet, excess coffee intake	

densitometry, this diagnostic test is indicated for 64 (55.6%) of the patients in the present study. Of the 51 (44.4%) women for whom densitometry was not indicated, 21 (41.2%) were found on ultrasound examination to have osteoporosis.

## Discussion

The prevalence of postmenopausal osteoporosis in the present study is higher than in other reports.<sup>8</sup> Díez Curiel et al<sup>9</sup> estimated the prevalence of osteoporosis by age group in Spanish women on the basis of densitometric findings. The prevalence of osteoporosis according to measurements in lumbar vertebrae was 24.29% in women aged 60 to 69 years, and rose to 40% in women aged 70 to 79 years. The prevalence in women older than 50 years of age was 22.8%. In comparison to the present study, the difference for each of these age groups is statistically significant. We found osteoporosis in 45.5% of our patients aged 60–69 years, 65.6% of those aged 70–79 years, and 48.1% of the women older than 50 years.

Two thirds (66.7%) of the postmenopausal women with osteoporosis had a normal body mass index. Díez Pérez et al<sup>10</sup> evaluated the prevalence of risk factors for osteoporosis in women older than 65 years. They considered body weight lower than 57 kg to be a risk factor for osteoporosis, with a prevalence of 14.6% (95% CI, 13.6%–15.5%). In the present study 13% of the women weighed less than 57 kg.

In view of our results, we suggest that community-level educational programs about this widely prevalent disorder

Discussion  
Key points



### What Is Known About the Subject

- Osteoporosis is an emerging health problem.
- Early management of risk factors is the most effective method for preventing osteoporotic fractures.

### What This Study Contributes

- The prevalence of alterations in bone density is high among postmenopausal women.
- Community-level educational actions are needed to try to change lifestyle habits associated with the development of osteoporosis.
- Bone ultrasound studies can play a useful role in screening for osteoporosis in primary care.

should begin at an earlier age in order to identify modifiable risk factors (Table 3) associated with the appearance of osteoporosis.<sup>12</sup> Such programs should also aim to identify patients who may require early treatment.<sup>13</sup>

We believe that quantitative bone ultrasound studies, despite their limitations, are a potentially useful tool for osteoporosis screening in primary care for postmenopausal women. However, uniform diagnostic criteria for osteoporosis are still not available for these techniques. As an added word of caution, ultrasound techniques and should not be used to monitor response to treatment<sup>5</sup> as the peripheral skeleton responds to scanning with small increases in bone density that are within the margin of error of precision of these devices.

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## COMMENTARY

# Is Osteoporosis a Prevalent Problem in Primary Care?

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In light of the results in the article titled “Prevalence of osteopenia and osteoporosis in postmenopausal women,” which appears in this issue of *ATENCIÓN PRIMARIA*, the answer is yes, the prevalence of osteoporosis in our offices is high. According to data from this study, more than half of the women seen fulfilled some of the criteria for osteoporosis. Nevertheless, the impression is that primary care tends to emphasize the cardiovascular risks, with little mention of the risks of bone fractures.

The reasons for this unsatisfactory approach to osteoporosis are varied. Physicians receive little training in this topic, and this makes it difficult to judge the usefulness of the contradictory information they are subjected to from different sources (health authorities, journals, mass media, pharmaceutical industry, consensus documents, etc). As a result the physician's opinion varies depending on the impact of the information he or she receives. Moreover, because access is limited to bone densitometry, the gold standard of diagnostic methods,<sup>1</sup> primary care physicians are uninterested in keeping up to date on a disease they cannot diagnose. Nor should we forget the findings of the ABOPAP study, which showed that 75% of all family physicians in Spain did not have access to bone densitometry, the only exceptions being the regions of Catalonia and a few other regions and individual centers where access was feasible.<sup>2,3</sup>

Personally, I believe the problem should be approached from two angles. Criteria developed by scientific societies should be used more widely to catalyze the development of clinical guidelines for the management of osteoporosis, but unfortunately distribution of these guidelines is conditioned by the interests of health authorities or the pharmaceutical industry. In addition, access should be facilitated to diagnostic tests such as bone densitometry or prescreening with peripheral ultrasound, as it is at the primary care level where interventions can be carried out most effectively.

We are all aware that osteoporosis is a risk factor for a more serious event—fracture—which is responsible for increased mortality and health care costs. Obviously not all cases of osteoporosis should be treated with medication, although this should be used when the risk of fracture is

## Key Points

- Osteoporosis is a prevalent problem in primary care.
- Management of osteoporosis in primary care should be encouraged by increasing diagnostic capacity at this level of care.
- Ultrasound examinations and questionnaires are a potentially useful option for population screening.

high whether because of genetic predisposition, previous fracture or very low t-score. A recent study showed that at a femoral t-score of  $-3$  or lower, the risk of fracture is greatly increased, and pharmacological treatment is indicated.<sup>4</sup>

With regard to limited access to bone densitometry, the reasons argued by the health administration are based on its low cost-efficiency, since the results are not highly predictive of fracture. While this is true, we should remember that densitometry results are the best marker available for clinicians to evaluate the risk of a first fracture. The costs, in fact, vary widely between different areas. In Barcelona the cost of a single scan ranges from approximately 30 to 40 euros, not an excessively high figure compared to the cost of treatment which is not indicated.

Evidently, the risk implied by a given t-score varies depending on other risk factors, but a t-score of  $-4$  remains an indicator of a high risk of fracture even in the absence of other accompanying risk factors. As the study by Reyes Balaguer and Moreno Olmos shows, ultrasound is a potentially useful technique for population screening because of its ease of use, but we also need to remember that it is a nonstandardized technique and that the cut-off point for osteoporosis can differ depending on the apparatus and

model. This is not the case with dual-energy x-ray absorptiometry, for which the standard cut-off point is a t-score of  $-2.5$  for the lumbar spine and femoral neck.

The use of questionnaires (e.g., ORAI, OST, OSIRIS, or SCORE) has been proposed in an attempt to obviate the need for densitometry. The cost-efficiency of these instruments has been evaluated in comparison to the cost of bone densitometry in Belgium—estimated at 40 euros.<sup>5,6</sup> Questionnaires can bring the cost per case diagnosed down from 117 euros (no questionnaire) to 85 euros (OSIRIS questionnaire) or 103 euros (SCORE questionnaire). However, these results were obtained at a cost of failure to diagnose 25% and 11% respectively of all cases of osteoporosis. Reliance on questionnaires alone to diagnose osteoporosis must therefore be viewed with caution.

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